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(71) Applicant:
Matsushita Electric Industrial Co., Ltd.
Kadoma-shi, Osaka 571-8501 (JP)

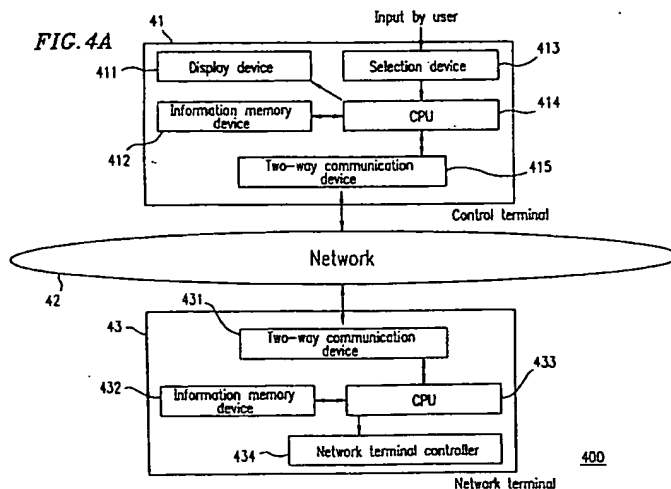
(72) Inventors:
• Hatakeyama, Takeshi
Osaka-shi, Osaka (JP)
• Kitao, Mitsuru
Yamamoto-koriyama-shi, Nara-ken (JP)
• Moriguchi, Ken-ichi
Neyagawa-shi, Osaka (JP)

(74) Representative:
Schwabe - Sandmaier - Marx
Stuntzstrasse 16
81677 München (DE)

(54) Network control system, network terminal and control terminal

(57) A network control system is provided which includes: a network terminal; and a control terminal. The network terminal transmits to the control terminal manipulation information indicating a type of at least one manipulation component and a manipulation requesting signal corresponding to the manipulation component, receives from the control terminal the manipulation requesting signal, and performs an operation corresponding to the manipulation requesting signal upon receipt of the manipulation requesting signal from the control terminal. The control terminal includes at least one manipulation component, receives and

analyzes the manipulation information from the network terminal, selects the type of the manipulation component indicated by the manipulation information, corresponds the selected manipulation component and the manipulation requesting signal indicated by the manipulation information, thereby establishing a manipulation environment for controlling the network terminal, and, when the manipulation component is selectively manipulated, transmits the manipulation requesting signal to the network terminal.



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generator 112 fetches command 3 shown in Figure 3 from the control code table RAM 115 and transmits the signal indicating the command 3 from the transmitter 113 to the network terminal 12.

The receiver 121 of the network terminal 12 receives the signal indicating the command 3, and provides the command 3 to the received data analyzer 122. The received data analyzer 122 analyzes the command 3 and requests to the network terminal controller 124 to perform the desired operation. The network terminal controller 124 executes the command 3 and instructs the video player 21 to rewind.

In the above-described manner, the manipulation information is transmitted from the network terminal 12 to the control terminal 11, whereby a manipulation environment for remotely controlling the network terminal 12 is established in the control terminal 11.

Even when a plurality of unspecified network terminals are used, manipulation environments for remotely controlling the network terminals can be established based on manipulation information which is provided from the network terminals to the control terminal when the network terminals are combined with the control terminal. A manipulation environment for remotely controlling the network is established for each network terminal. By registering the manipulation environments in the control terminal, the plurality of network terminals can be remotely controlled by one control terminal.

However, the above-described conventional network control system 100 has the following problems.

In the conventional network control system 100, even a manipulation button, for example, a power button, which performs a same operation to all of the network terminals, is set by transmitting a combination of a command and an icon thereof from the network terminal to the control terminal. As a result, such a button may not be arranged in the same way for all of the network terminals.

Since commands and icons are transmitted for all of the manipulation buttons from the network terminal to the control terminal, the amount of transmitted information is large, which requires a long time for transmitting the information. For example, when one icon is represented by a 16 x 16 bit map, a total of 256 bits need to be transmitted. When the information transmission rate by an infrared signal from the network terminal to the control terminal is 200 bits per second, a transmission time of 1 second or more is required for each icon.

According to the conventional network control system 100, there is no function of collectively arranging a plurality of related manipulation buttons instructing similar functions, for example, a pair of volume buttons for instructing "Volume up" and "Volume down". In this case, therefore, the pair of volume buttons may not be collectively arranged in convenient positions.

According to the conventional network control system 100, although a plurality of network terminals can be remotely controlled by one control terminal, they

cannot be collectively controlled. For example, when one application is realized by a plurality of network terminals, each of the networks needs to be remote controlled by the control terminal separately.

SUMMARY OF THE INVENTION

According to one aspect of the present invention, a network control system is provided which includes: a network terminal; and a control terminal. The network terminal transmits to the control terminal manipulation information indicating a type of at least one manipulation component and a manipulation requesting signal corresponding to the manipulation component, receives from the control terminal the manipulation requesting signal, and performs an operation corresponding to the manipulation requesting signal upon receipt of the manipulation requesting signal from the control terminal. The control terminal includes at least one manipulation component, receives and analyzes the manipulation information from the network terminal, selects the type of the manipulation component indicated by the manipulation information, corresponds the selected manipulation component and the manipulation requesting signal indicated by the manipulation information, thereby establishing a manipulation environment for controlling the network terminal, and, when the manipulation component is selectively manipulated, transmits the manipulation requesting signal to the network terminal.

In accordance with one embodiment of the present invention, a predetermined manipulation component of the at least one manipulation component predeterminedly corresponds to a predetermined operation of the network terminal.

In accordance with one embodiment of the present invention, the at least one manipulation component is assigned to a physical manipulation button of the control terminal.

In accordance with one embodiment of the present invention, the at least one manipulation component is assigned to a manipulation button displayed on a display section of the control terminal.

In accordance with one embodiment of the present invention, the at least one manipulation component includes manipulation components belonging to a manipulation component group, and the control terminal collectively processes the manipulation component of the manipulation component group.

In accordance with one embodiment of the present invention, the network control system includes a plurality of network terminals, at least one of which identifies an application which can be realized by exchanging function information among the plurality of network terminals; transmits to the control terminal manipulation information indicating a type of at least one manipulation component for controlling the function and a manipulation requesting signal corresponding to the

invention, a network control system is provided which includes: a plurality of network terminals, at least one of which identifies an application which can be realized by exchanging function information among the plurality of network terminals, transmits to the control terminal
5 manipulation information indicating a manipulation environment for controlling the function and a manipulation requesting signal corresponding to the manipulation component, receives the manipulation requesting signal from the control terminal, and performs an operation
10 corresponding to the manipulation requesting signal upon receipt of the manipulation requesting signal from the control terminal; and a control terminal which receives and analyzes the manipulation information, establishes the manipulation environment indicated by
15 the manipulation information, and when the manipulation environment is manipulated intended for the function, transmits the manipulation requesting signal to at least one of the network terminals.

According to still another aspect of the present invention, a plurality of network terminals which are controlled by a control terminal including at least one manipulation component are provided. At least one of the plurality of network terminals identifies an application which can be realized by exchanging function information among the plurality of network terminals, and transmits to the control terminal manipulation information indicating a manipulation environment for controlling the function and a manipulation requesting signal, and performs an operation corresponding to the function upon receipt of the manipulation requesting signal from the control terminal.

Thus, the invention described herein makes possible the advantages of providing: (1) a network control system in which the amount of manipulation information transmitted from a network terminal to a control terminal is reduced; (2) a network control system in which manipulation components which perform same operations to a plurality of network terminals are already provided in the control terminal so as to provide the control terminal with a usable manipulation environment; (3) a network control system in which related manipulation components are set in the control terminal as a group so as to provide the control terminal with a usable manipulation environment; and (4) a network control system in which a manipulation environment for remotely controlling an application which is provided by a plurality of network terminals can be automatically set.

These and other advantages of the present invention will become apparent to those skilled in the art upon reading and understanding the following detailed description with reference to the accompanying figures.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a block diagram showing a conventional network control system;

Figure 2 is a schematic diagram showing a video apparatus which is provided with the network terminal shown in Figure 1;

Figure 3 is a table showing examples of commands and icons corresponding thereto in the network control system shown in Figure 1;

Figure 4A is a block diagram schematically showing a network control system according to a first example of the present invention;

Figure 4B is a schematic sequence chart showing a communication protocol of the network control system according to the first example of the present invention;

Figure 5 is a block diagram showing an exemplary application of the network control system according to the first example of the present invention;

Figure 6 is a view showing the external appearance of a control terminal in the network control system according to the first example of the present invention;

Figure 7A shows a manipulation environment of the control terminal of Figure 6 for the television terminal;

Figure 7B shows a manipulation environment of the control terminal of Figure 6 for the video terminal;

Figure 7C shows a manipulation environment of the control terminal 41 of Figure 6 for the image receiver terminal;

Figure 8 is a data table showing types of the manipulation components according to the first example of the present invention;

Figure 9 is a diagram showing manipulation information for establishing the manipulation environment shown in Figure 7A for remotely controlling the television terminal of the network control system according to the first example of the present invention;

Figure 10 is a diagram showing manipulation information for establishing the manipulation environment shown in Figure 7B for remotely controlling the video terminal of the network control system according to the first example of the present invention;

Figure 11 is a diagram showing manipulation information for establishing the manipulation environment shown in Figure 7C for remotely controlling

one of the television terminal 43-1, the video terminal 43-2 and the image receiver terminal 43-3 is shown.

Returning to Figure 4A, the control terminal 41 includes a display device 411, an information memory device 412, a selection device 413, a central processing unit (hereinafter, simply referred to as a "CPU") 414 and a two-way communication device 415. The network terminal 43 includes a two-way communication device 431, an information memory device 432, a CPU 433 and a network terminal controller 434.

The network 42 is an infrared network which enables two-way communication between the control terminal 41 and the network terminal 43.

Figure 6 is a plan view showing the appearance of the control terminal 41. Referring to Figure 6, the control terminal 41 has a power button 62, a menu button 63, a display panel 64 of the display device 411, variable buttons 65, 66, 67 and 68, a jog dial 69, a select button 610, a cancel button 611 and a cross-shaped button 612. The above-described buttons are included in the selection device 413.

The power button 62 performs a same operation to each of the network terminals 43-1, 43-2 and 43-3, and turns the network terminals 43 on and off.

The menu button 63 performs a same operation to each of the network terminals 43-1, 43-2 and 43-3, and is used to call a menu for each of the network terminals 43.

The variable buttons 65, 66, 67 and 68 are assigned with functions unique to each of the network terminals 43-1, 43-2 and 43-3, for remotely controlling the network terminals 43-1, 43-2 and 43-3. The functions of the variable buttons 65, 66, 67 and 68 are displayed on the display panel 64. In other words, the display panel 64 displays icons and text corresponding to the variable buttons 65, 66, 67 and 68, thereby representing the functions unique to the network terminals 43-1, 43-2 and 43-3.

The jog dial 69 is used for selecting the network terminal 43-1, 43-2 or 43-3 which is to be remotely controlled. By rotating the jog dial 69, the network terminal 43-1, 43-2 or 43-3 can be switched from one to another.

The select button 610 and the cancel button 611 perform same operations to the network terminals 43-1, 43-2 and 43-3. The select button 610 and the cancel button 611 are used to select menu displayed on a display panel of the network terminal 43-1, 43-2 or 43-3, or to cancel the selected menu.

The cross-shaped button 612 performs the same operation to the network terminals 43-1, 43-2 and 43-3. The cross-shaped button 612 is used to move a cursor on the menu displayed on the display panel of the network terminal 43-1, 43-2 or 43-3.

The power button 62, the menu button 63, the select button 610, the cancel button 611 and the cross-shaped button 612 perform the same operations to the network terminals 43-1, 43-2 and 43-3. Since each of these buttons has a fixed position and a fixed function, a

user can easily manipulate the control terminal 41.

Figures 7A, 7B and 7C are plan views showing the manipulation environments of the control terminal 41 for the television terminal 43-1, the video terminal 43-2 and the image receiver terminal 43-3, respectively.

Figure 7A shows the manipulation environment of the control terminal 41 for the television terminal 43-1. Referring to Figure 7A, text "TV" appears on the upper left corner of the display panel 64, indicating that the television terminal 43-1 is selected. Only the power button 62 is validated as a common operation button. The variable buttons 65, 66, 67 and 68 are assigned with the commands "channel up", "channel down", "volume up" and "volume down", respectively. Icons indicating the respective functions are displayed on the display panel 64 so as to correspond to the variable buttons 65, 66, 67 and 68, respectively.

Figure 7B shows the manipulation environment of the control terminal 41 for the video terminal 43-2. Referring to Figure 7B, text "VTR" appears on the upper left corner of the display panel 64, indicating that the video terminal 43-2 is selected. Only the power button 62 is validated as a common operation button. The variable buttons 65, 66, 67 and 68 are assigned with the commands "rewind", "play", "stop" and "fast forward", respectively. Icons indicating the respective functions are displayed on the display panel 64 so as to correspond to the variable buttons 65, 66, 67 and 68, respectively.

Figure 7C shows the manipulation environment of the control terminal 41 for the image receiver terminal 43-3. Referring to Figure 7C, text "STB" appears on the upper left corner of the display panel 64, indicating that the image receiver terminal 43-3 is selected. The power button 62, the menu button 63, the select button 610, the cancel button 611 and the cross-shaped button 612 are validated as common operation buttons. The two variable buttons 65 and 66 are assigned with the commands "channel up" and "channel down", respectively. Icons indicating the respective functions are displayed on the display panel 64 so as to correspond to the variable buttons 65 and 66, respectively.

In the above-described manipulation environments, text indicating the selected network terminal 43 to be controlled is always displayed on the upper left corner of the display panel 64. Therefore, the user can see which network terminal 43 is presently selected. By rotating the jog dial 69, the network terminal 43 to be controlled can be switched among the television terminal 43-1, the video terminal 43-2 and the image receiver terminal 43-3, whereby the manipulation environment corresponding to the selected network terminal 43 is switched as well.

In order to set the above-described manipulation environments in the control terminal 41 to remotely control the network terminal 43, the manipulation environment for each network terminal 43 needs to be registered in the control terminal 41 in advance. When

43-1 shown in Figure 7A, text "TV" is displayed on the display panel 64, the power button 62 and the variable buttons 65, 66, 67 and 68 are validated, and icons representing the functions are displayed on the display panel 64. The manipulation environment for remotely controlling the television terminal 43-1 is thus formed.

After each of the manipulation environments for remotely controlling the network terminals 43 has been registered into the control terminal 41, the network terminals 43-1, 43-2 and 43-3 can be selected by rotating the jog dial 69 so as to be remotely controlled by the control terminal 41.

When, for example, the television terminal 43-1 is selected by manipulating the jog dial 69, the CPU 414 fetches the manipulation information of the television terminal 43-1 from the information memory device 412, thereby analyzing the manipulation information and establishing the manipulation environment for the television terminal 43-1.

In this state, when the user presses a button of the selection device 413, the selection device 413 outputs a manipulation requesting signal corresponding to the pressed button to the CPU 414. The CPU 414 transmits the manipulation requesting signal to the network 42 together with the identification number of the television terminal 43-1 via the two-way communication device 415.

The television terminal 43-1 receives the manipulation requesting signal and the identification number via the two-way communication device 431. The signal is then input to the CPU 433. The CPU 433 confirms that the identification number is that of the television terminal 43-1, and then outputs the manipulation requesting signal to the network terminal controller 434. The network terminal controller 434 performs an operation represented by the manipulation requesting signal.

As a result, a predetermined operation of the television terminal 43-1 which is requested by manipulating the button of the control terminal 41 is performed.

Hereinafter, a specific format of the manipulation information, a process of analyzing the manipulation information by the CPU 414 and a specific format of the manipulation requesting signal will be described.

As previously described, the manipulation information according to the conventional network control system 100 consists of sets of a command and an icon. In this case, the manipulation buttons which perform the same operations to all of the network terminals are not always arranged in the same way for all of the network terminals. Moreover, even when frequently used icon and text such as "channel up", "channel down", "volume up" and "volume down" are used, the same icon and text need to be transmitted a great number of times, thereby rendering the system ineffective. In addition, even for the same icon and text such as "channel up", "channel down", "volume up" and "volume down", the shapes of the icons may be different among different network terminals, thereby confusing the user.

In order to overcome the above-described problems, the manipulation environment of the control terminal 41 according to the first example of the present invention includes a plurality of manipulation components which are defined of their types in advance. The manipulation information transmitted from the network terminal 43 to the control terminal 41 has identification numbers for identifying the manipulation components, types of the manipulation components and additional information.

Hereinafter, the types of the manipulation components according to the first example of the present invention will be described. The types of the manipulation components represent basic types of the manipulation components. All of the manipulation buttons and display contents belong to one type of a manipulation component.

Figure 8 is a data table 81 showing the types of the manipulation components according to the first example of the present invention.

With reference to Figure 8, a manipulation component of a type "Button group" is a group of a plurality of lower order manipulation components. As additional information, the "Button group" has text and icons, and identification numbers of the manipulation components belonging to the group. The identification numbers of the manipulation components are used for identifying the manipulation components and are assigned to all of the manipulation components.

A manipulation component of a type "Power button" is the power button 62, having no additional information.

A manipulation component of a type "parameter button" is a set of variable buttons 65 and 66 or a set of variable buttons 67 and 68, having text and/or icon as additional information.

A manipulation component of a type "Menu button" is the menu button 63, having no additional information.

Each of manipulation components of a type "Simple button" is the variable button 65, 66, 67 or 68 assigned with a corresponding function. The "Simple button" has text and/or icon representing the corresponding function as additional information.

A manipulation component of a type "Select button" is the select button 610, having no additional information.

A manipulation component of a type "Cancel" only applies to the cancel button 611, having no additional information.

A manipulation component of a type "Movement button" is the cross-shaped button 612, having no additional information.

The manipulation information according to the first example of the present invention which is transmitted from the network terminal 43 to the control terminal 41 includes at least a part of the information shown in Figure 8. The control terminal 41 has data and program for decrypting the manipulation information including the identification numbers, the manipulation component

icons are used for instructing "play", "stop" and "fast forward", respectively.

Since the manipulation components given the identification numbers 4, 5, 6 and 7 belong to the higher order manipulation component type given the identification number 3, they are treated as a group in the manipulation environment 102. Accordingly, even when the control terminal 41 has more than four variable buttons, the manipulation components given the identification numbers 4, 5, 6 and 7 are treated as one group and are sequentially and collectively assigned to the plurality of variable buttons so that the manipulation components are arranged close to each other.

Figure 11 is a diagram showing the manipulation information 1102 for establishing the manipulation environment shown in Figure 7C for remotely controlling the image receiver terminal 43-3 in the network control system 400 according to the first example of the present invention. Figure 11 further shows the manipulation components 1101 represented by the manipulation information 1102.

In the manipulation information 1102, the manipulation component type "Button group" given an identification number 1 is a main button group of the image receiver terminal 43-3. The "Button group" includes text "STB" as additional information which is displayed on the upper left corner of the display panel 64 of the display device 411. The "Button group" further includes, as the additional information, identification numbers 2, 3, 4, 5, 6 and 7 corresponding to the lower order manipulation components belonging to the group.

The manipulation component type "Power button" given the identification number 2 represents the power button 62, and includes no additional information.

The manipulation component type "Parameter button" given the identification number 3 represents the menu button 63.

The manipulation component type "Parameter button" given the identification number 4 represents buttons for instructing "channel up" and "channel down". The "Parameter button" includes text "CH" as additional information. An upwardly pointing arrow icon and a downwardly pointing arrow icon are registered in the control terminal 41 in advance as additional information of the "Parameter Button". The upwardly pointing arrow icon and the downwardly pointing arrow icon are displayed with the text "CH" as shown in Figure 7C. The variable buttons 65 and 66 below the icons are used for instructing "channel up" and "channel down".

The manipulation component type "Select" given the identification number 5 represents the select button 610.

The manipulation component type "Cancel" given the identification number 6 represents the cancel button 611.

The manipulation component type "Movement button" given the identification number 7 represents the cross-shaped button 612.

The above-described manipulation information is transmitted from each of the network terminals 43 to the control terminal 41. Based on this manipulation information, the manipulation environments for remotely controlling the network terminals are registered in the control terminal 41.

Hereinafter, analysis of the manipulation information performed by the control terminal 41 will be described with reference to Figure 12.

Figure 12 is a flow diagram showing operations performed by the control terminal 41 of the network control system 400 according to the first example of the present invention.

Once the CPU 414 of the control terminal 41 receives the manipulation information from the network terminal 43, the CPU 414 starts analyzing the manipulation information (Step 1201). The CPU 414 selects and analyzes a manipulation component corresponding to the main button group from the manipulation information, thereby reading and displaying an icon and/or text of the manipulation component on the upper left corner of the display panel 64 (Step 1202). Thereafter, when the manipulation information still includes an unprocessed manipulation component (Step 1203, YES), the CPU 414 analyzes the unprocessed manipulation component (Step 1204) and assigns this manipulation component to the control terminal 41 (Step 1205). Then, the CPU 414 confirms whether or not the manipulation information includes an unprocessed manipulation component (Step 1206). When the manipulation information includes an unprocessed manipulation component (Step 1206, YES), the process returns to Step 1204. When the manipulation information does not include an unprocessed manipulation component (Step 1206, NO), analysis of the manipulation information is completed.

For example, when the control terminal 41 receives the manipulation information for establishing the manipulation environment of the television terminal 43-1 shown in Figure 9, the manipulation information is analyzed according to the following steps.

The text "TV" is read from the additional information of the manipulation component type corresponding to the main button group given the identification number 1, and is displayed on the upper left corner of the display panel 64.

The identification numbers 2, 3 and 4 are read from the additional information of the manipulation component of the identification number 1, and the manipulation components given the identification numbers 2, 3 and 4 are analyzed.

The manipulation component type of the identification number 2 is the power button 62. Thus the power button 62 of the control terminal 41 is validated.

The manipulation component type of the identification number 3 is "Parameter button". Thus, text "CH" is read from the additional information of the manipulation component. The text "CH" is combined with the

reduced.

According to the first example of the present invention, the television terminal 43-1, the video terminal 43-2 and the image receiver terminal 43-3 are illustrated as the network terminals 43. The present invention, however, is applicable to other types of network terminals.

According to the first example of the present invention, a radio infrared network is used as the network 42. The present invention, however, is equally applicable when a cable network is used.

Furthermore, according to the first example of the present invention, the control terminal 41 performs polling so as to confirm whether or not there is a new network terminal 43. When there is a new network terminal 43, the control terminal 41 requests manipulation information to be transmitted from the new network terminal 41, so as to download the manipulation information of the new network terminal 41. The present invention, however, is not limited thereto, and the manipulation information may be downloaded according to any kind of method. For example, the manipulation information may be spontaneously transmitted from the network terminal 43 to the control terminal 41 when the power of the network terminal 43 is turned on, or when the network terminal 43 connects to the network 42.

According to the first example of the present invention, buttons are used as manipulation elements. The present invention, however, is not limited thereto, and is equally applicable when other elements (e.g., speech recognition elements or voice guiding elements) are used for manipulation.

(Example 2)

Hereinafter, a network control system 1300 including a control terminal 1301 and a network terminal 1303 according to a second example of the present invention will be described.

Figure 13 is a schematic diagram showing the network control system 1300 according to the second example of the present invention. The network control system 1300 includes the control terminal 1301, a network 1302 and a car navigation system as the network terminal 1303.

According to the second example of the present invention, the network 1302 is a cable network. The control terminal 1301 remotely controls the car navigation system 1303 via the cable network 1302.

The control terminal 1301 and the car navigation system 1303 function in substantially the same manner as the control terminal 41 and the network terminal 43 shown in Figure 4A.

The manner of downloading manipulation information, structure of the manipulation information and the manner of transmitting the manipulation requesting signal are basically the same as those according to the first example of the present invention.

Specifically, manipulation information is down-

loaded from the car navigation system 1303 to the control terminal 1301 so that a manipulation environment for remotely controlling the car navigation system 1303 is established in the control terminal 1301.

According to the second example, the manipulation information is downloaded when the car navigation system 1303 connects to the network 1302. In other words, manipulation information is transmitted from the car navigation system 1303 to the control terminal 1301 when the car navigation system 1303 connects to the network 1302 as a new network terminal.

Figure 14 is a plan view showing the manipulation environment for remotely controlling the car navigation system 1303 established on the control terminal 1301.

A display screen 1401 is displayed on the display panel 64 of the display device 411 of the control terminal 1301. The display screen 1401 represents the manipulation environment for remotely controlling the car navigation system 1303, including a "Zoom in" (enlargement) button 1411, a "Zoom out" (contraction) button 1412, a position button 1413 for displaying the present position and a cross-shaped button 1414 for moving a cursor.

The "Zoom in" button 1411, the "Zoom out" button 1412, the "position" button 1413 and the cross-shaped button 1414 (including left, right, up and down buttons) are displayed on the display panel 64 of the display device 411 of the control terminal 1301. The display panel 64 is a touch panel display. When the user touches one of these manipulation buttons, a manipulation requesting signal corresponding to the touched button is transmitted from the control terminal 1301 to the car navigation system 1303. In response to this manipulation requesting signal, the car navigation system 1303 performs an operation corresponding to the transmitted manipulation requesting signal.

Figure 15 is a diagram showing the manipulation information 1502 for establishing the manipulation environment shown in Figure 14 for remotely controlling the car navigation system 1303 in the network control system 1300 according to the second example of the present invention. Figure 15 further shows the manipulation components 1501 represented by the manipulation information 1502.

In the manipulation information 1502, the manipulation component type "Button group" given an identification number 1 is a main button group of the car navigation system 1303. The "Button group" includes text "Car navigation" as additional information which is used as information for the user to read. The "Button group" further includes, as the additional information, the identification numbers 2, 3 and 6 corresponding to the lower order manipulation components belonging to the group.

The manipulation component type "Simple button" given the identification number 2 represents the "Position" button 1413 and has text "Position" as additional information.

As can be appreciated from the display screens 1702, 1703 and 1704 shown in Figure 17, the related "Zoom in" and "Zoom out" buttons 1411 and 1412 are displayed separately on the display screens 1702 and 1703. Therefore, in order to alternately use the "Zoom in" and "Zoom out" buttons 1411 and 1412, the user should proceed the steps of switching the display screens in the order of "1701 → 1702 → 1701 → 1703" or "1701 → 1703 → 1701 → 1702", which renders the manipulation complicated.

According to the second example of the present invention, the manipulation information is transmitted from the network terminal, i.e., the car navigation system 1303, to the control terminal 1301. The transmitted manipulation information is analyzed by the control terminal 1301, thereby establishing the manipulation environment for the user. Since related manipulation buttons are grouped into one button group, the related buttons are collectively displayed, thereby enhancing the usability of the control terminal 1301 for the user.

According to the second example of the present invention, a car navigation system is illustrated as the network terminal 1303. The present invention, however, is not limited thereto and is equally applicable to other network terminals.

Moreover, according to the second example of the present invention, a cable network is used as the network 1302. The present invention, however, is equally applicable when a radio network is used as the network 1302.

Furthermore, according to the second example of the present invention, the manipulation information is downloaded from the network terminal 1303 to the control terminal 1301 when the network terminal 1303 connects to the control terminal 1301. The present invention, however, is not limited thereto, and the manipulation information may be downloaded according to any kind of method.

According to the second example of the present invention, buttons are used as manipulation elements. The present invention, however, is not limited thereto and is equally applicable when other elements (e.g., speech recognition elements or voice guiding elements) are used for manipulation.

(Example 3)

Hereinafter, a network control system 1800 including a control terminal 1801 and network terminals 1803, 1804 and 1805 according to a third example of the present invention will be described.

Figure 18 is a block diagram schematically showing the network control system 1800 according to the third example of the present invention. The network control system 1800 includes a control terminal 1801, a network 1802, a car navigation operator 1803, a CD-ROM driver 1804 and a GPS (Global Positioning System) 1805. According to the third example of the present

invention, the car navigation operator 1803, the CD-ROM driver 1804 and the GPS 1805 are the network terminals.

According to the third example of the present invention, manipulation information is transmitted from the network terminals to the control terminal 1801 in substantially same manner as in the first example of the present invention. The transmitted manipulation information is analyzed by the control terminal 1801, thereby establishing a manipulation environment for remotely controlling the network terminals 1803, 1804 and 1805. The structure of the control terminal 1801, the structures of the network terminals 1803, 1804 and 1805, the types of the manipulation components are substantially the same as those according to the previously described examples of the present invention.

According to the third example of the present invention, an application is not realized only by the car navigation operator 1803. The application is realized when the network terminals (i.e., the car navigation operator 1803, the CD-ROM driver 1804 and the GPS 1805) are combined.

Specifically, the car navigation operator 1803 receives data indicating a map from the CD-ROM driver 1804 via the network 1802 and receives location data from the GPS 1805, thereby performing an operation.

In the network control system 1800 according to the third example of the present invention, a manipulation environment for remotely controlling the above-described application is automatically established in the control terminal 1801 when the car navigation operator 1803, the CD-ROM driver 1804 and the GPS 1805 are connected to each other.

One network terminal receives function information from other network terminals via the network 1802, and identifies what kind of application can be provided when combined with the other network terminals. Then, the identified application is transmitted to the control terminal 1801. Herein, the term "function information" refers to information indicating a function of each network terminal.

Figure 19 is a table 1901 showing function information which are exchanged among the network terminals 1803, 1804 and 1805.

The car navigation operator 1803 transmits function information "car navigation operation". The CD-ROM driver 1804 transmits function information "car navigation data". The GPS 1805 transmits function information "positioning".

The above-mentioned function information is exchanged among the network terminals. Based on the function information from other network terminals, each network terminal determines whether or not its application can be realized.

In order to realize the car navigation application, the car navigation operator 1803 requires a network terminal having a function of "car navigation data" and a network terminal having a function of "positioning". The car

the CD-ROM driver 2005 is exchanged.

Hereinafter, manipulation environments according to the fourth example of the present invention will be described with reference to Figures 21A, 21B and 21C.

Figures 21A, 21B and 21C are plan views showing display screens 2101, 2102 and 2103, respectively, which are displayed on a display panel 64 of a display device 411 of the control terminal 2001. The display screens 2101 and 2102 are manipulation environments used for remotely controlling the video player 2006. The display screen 2103 is a manipulation environment used for remotely controlling the car navigation operator 2004.

The display screen 2101 is used when both of the DVD-ROM driver 2002 and the CD-ROM driver 2005 include video data. A "Video Player" button 2111 and a "Car Navigation System" button 2112 are used for selecting the application. In Figures 21A, 21B and 21C, shaded button corresponds to a presently selected application.

When both of the DVD-ROM driver 2002 and the CD-ROM driver 2005 include video data, the car navigation operator 2004 cannot realize the application of the car navigation system. Therefore, in Figure 21A, the "Car Navigation System" button 2112 of the display screen 2101 is drawn with a broken line, which indicates that the display screen does not change to the display screen 2103 for remotely controlling the car navigation system even when the "Car Navigation System" button 2112 is selected.

The manipulation environment shown in Figure 21A for remotely controlling the video player 2006 includes "Title A" and "Title B" buttons 2113 and 2114 for selecting video data, and a group of buttons 2115 including play, rewind, fast forward and stop buttons.

Since the video player 2006 operates by using a database of either one of the DVD-ROM driver 2002 or the CD-ROM driver 2005, the "Title A" and "Title B" buttons 2113 and 2114 are displayed for selecting the database.

The image screen 2102 and 2103 are the manipulation environments of the control terminal 2001 when the DVD-ROM driver 2002 has video data and CD-ROM driver 2005 has car navigation data. The car navigation operator 2004 operates while using the CD-ROM driver 2005 as a database and the video player 2006 operates while using the DVD-ROM driver 2002 as a database. The display screens 2102 and 2103, i.e., manipulation environments for remotely controlling the video player 2006 and the car navigation operator 2004, can be switched therebetween.

In the display screen 2102 which represents the manipulation environment for remotely controlling the video player 2006, only the DVD-ROM driver 2002 is available as the database of the video player 2006. Therefore, only the "Title A" button 2113 for selecting the video data in the DVD-ROM driver 2002 is displayed.

In the display screen 2103 which represents the manipulation environment for remotely controlling the car navigation operator 2004, a "Zoom in" button 2116, a "Zoom out" button 2117 and a cross-shaped button 2118 are displayed.

Figure 22 is a table 2201 showing function information exchanged among the network terminals 2002, 2004, 2005 and 2006.

When a video disk is in the DVD-ROM driver 2002, the DVD-ROM driver 2002 transmits "Video data" as function information. The function information includes text "Title A" which is information of a title of the video data.

When a video data disk is in the CD-ROM driver 2005, the CD-ROM driver 2005 transmits "Video data" as function information. The function information includes text "Title B" which is information of a title of the video data. Furthermore, when a car navigation data disk is in the CD-ROM driver 2005, the CD-ROM driver 2005 transmits "Car navigation data" as function information.

The function information of the CD-ROM driver 2005 changes in the above-described manner.

When both of the DVD-ROM driver 2002 and the CD-ROM driver 2005 include video disks, the video player 2006 receives "video data" from both of the DVD-ROM driver 2002 and the CD-ROM driver 2005. Therefore, the video player 2006 can provide an application for playing video data of "Title A" and "Title B". When video data disk is inserted only in the DVD-ROM driver 2002, an application for playing video data of title A is provided by receiving function information "video data" from the DVD-ROM driver 2002.

When there is no car navigation data in the CD-ROM driver 2005, the car navigation operator 2004 cannot receive function information "car navigation data", thereby being unable to provide car navigation application. When the CD-ROM driver 2005 includes a disk of car navigation data, the car navigation operator 2004 is able to receive function information "car navigation data", thereby providing car navigation application.

Hereinafter, manipulation information which changes according to the function of the network terminal will be described.

Figures 23 and 24 are diagrams showing manipulation information 2302 and 2402 for establishing manipulation environments shown in Figures 21A and 21B for remotely controlling the video player 2006. Figures 25 and 26 are diagrams showing manipulation information 2502 and 2602 for establishing manipulation environments for remotely controlling the car navigation operator 2004.

Figures 23, 24, 25 and 26 further show manipulation components 2301, 2401, 2501 and 2601, respectively.

A structure of manipulation information of the video player 2006, a structure of manipulation information of the car navigation operator 2004 and types of the

that the manipulation environment for remotely controlling the car navigation system can be realized.

Based on the function information from the CD-ROM driver 2005, the video player 2006 determines that video data is no longer supplied from the CD-ROM driver 2005, and transmits the manipulation information 2402 shown in Figure 24 where the "Title B" button is omitted to the control terminal 2201. Based on the manipulation information 2402, the control terminal 2001 determines that the "Title B" button is omitted.

As a result, the control terminal 2001 re-establishes the manipulation environment 2102 (Figure 21B) instead of the manipulation environment 2101.

Analysis of the manipulation information by a CPU of the control terminal 2001, and establishment of the manipulation environments are substantially the same as those in the previously described examples.

Operations performed when buttons are selectively manipulated are substantially the same as those in the previously described examples.

According to the fourth example of the present invention, after a manipulation requesting signal is transmitted from the control terminal 2001 to the network terminal 2005 and 2006 providing the application, a command instructing an operation needs to be transmitted from the network terminal 2005 and 2006 to other network terminals.

For example, in the display screen 2101 (Figure 21A), when the user selects the "Title A" button 2113, a manipulation requesting signal including an identification number 5 indicating the "Title A" button 2113 is transmitted from the control terminal 2001 to the video player 2006. In response to this manipulation requesting signal, the video player 2006 reproduces a title corresponding to "Title A". Specifically, the video player 2006 transmits a video data transmission request to the DVD-ROM driver 2002 in which the video data of title A is set. In response to this request, the DVD-ROM driver 2002 transmits the video data to the video player 2006. The video player 2006 receives the video data and reproduces the video data.

Various commands are set in the network terminals in advance, and are transmitted and received in known steps.

As described above, according to the fourth example of the present invention, the application is realized with a plurality of network terminals, and a manipulation environment corresponding to the application is established. In response to the change in the network terminals, function information is transmitted and received among the network terminals so as to change the application. By transmitting manipulation information corresponding to the application to the control terminal, the manipulation environment in the control terminal is changed as well.

According to the fourth example of the present invention, the car navigation operator and video player are illustrated as the network terminals. The present

invention, however, is not limited thereto, and is applicable when an application is provided by other types of network terminals.

Furthermore, according to the fourth example of the present invention, buttons are used as manipulation elements. The present invention, however, is not limited thereto, and is equally applicable when other elements (e.g., speech recognition elements or voice guiding elements) are used for manipulation.

Various other modifications will be apparent to and can be readily made by those skilled in the art without departing from the scope and spirit of this invention. Accordingly, it is not intended that the scope of the claims appended hereto be limited to the description as set forth herein, but rather that the claims be broadly construed.

Claims

1. A network control system, comprising:

a network terminal; and
a control terminal, wherein
the network terminal transmits to the control terminal manipulation information indicating a type of at least one manipulation component and a manipulation requesting signal corresponding to the manipulation component, receives from the control terminal the manipulation requesting signal, and performs an operation corresponding to the manipulation requesting signal upon receipt of the manipulation requesting signal from the control terminal; and
the control terminal includes at least one manipulation component, receives and analyzes the manipulation information from the network terminal, selects the type of the manipulation component indicated by the manipulation information, corresponds the selected manipulation component and the manipulation requesting signal indicated by the manipulation information, thereby establishing a manipulation environment for controlling the network terminal, and, when the manipulation component is selectively manipulated, transmits the manipulation requesting signal to the network terminal.

2. A network control system according to claim 1, wherein a predetermined manipulation component of the at least one manipulation component predeterminedly corresponds to a predetermined operation of the network terminal.

3. A network control system according to claim 1, wherein the at least one manipulation component comprises a physical manipulation button of the

the at least one manipulation component comprises a physical manipulation button of the control terminal.

16. A control terminal according to claim 13, wherein the at least one manipulation component comprises a manipulation button displayed on a display section of the control terminal.
17. A control terminal according to claim 13, wherein the at least one manipulation component comprises manipulation components belonging to a manipulation component group, and the control terminal collectively processes the manipulation component of the manipulation component group.
18. A control terminal according to claim 13, wherein the control terminal is a remote controller for remotely controlling the network terminal.
19. A control terminal for controlling a network terminal which performs an operation in response to a manipulation requesting signal, comprising:

at least one manipulation component;
a two-way communication section for receiving manipulation information from the network terminal and transmitting a manipulation requesting signal to the network terminal; and
a control section which analyzes the manipulation information received via the two-way communication system, selects a type of the manipulation component indicated by the manipulation information, corresponds the selected manipulation component and the manipulation requesting signal indicated by the manipulation information, thereby establishing a manipulation environment for controlling the network terminal, and, when the manipulation component is selectively manipulated, transmits the manipulation requesting signal to the network terminal via the two-way communication section.

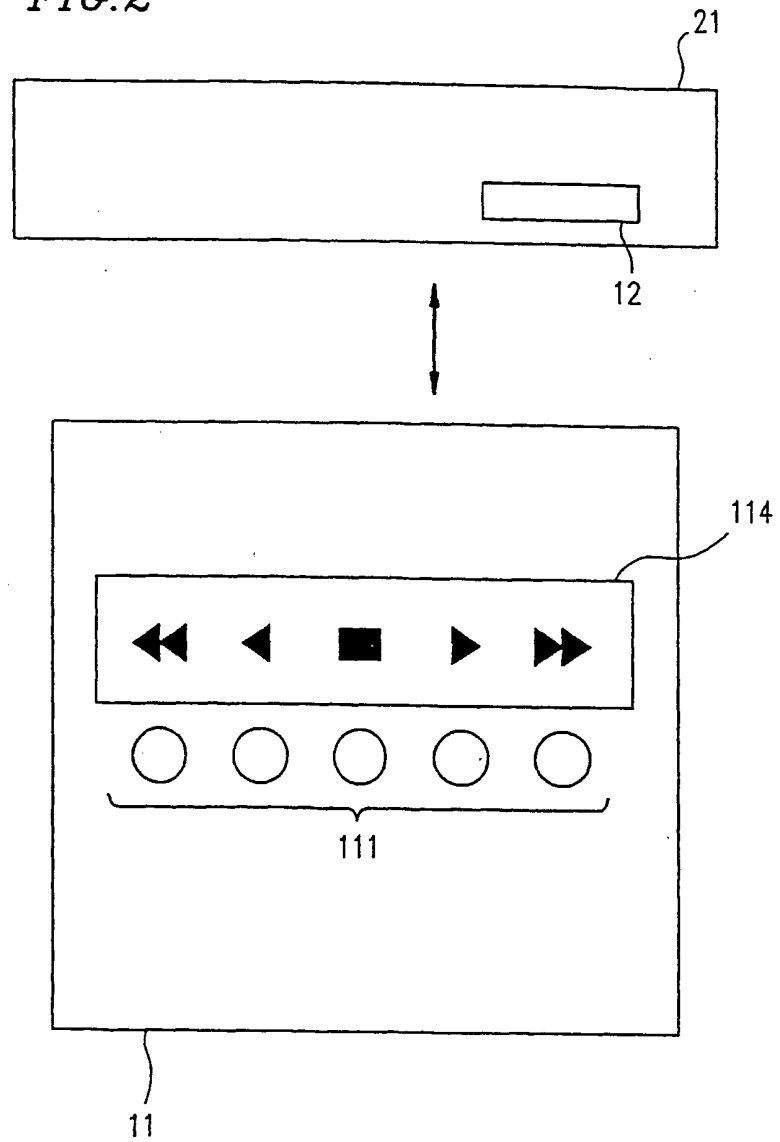
20. A network control system, comprising:
a plurality of network terminals, at least one of which identifies an application which can be realized by exchanging function information among the plurality of network terminals, transmits to the control terminal manipulation information indicating a manipulation environment for controlling the function and a manipulation requesting signal corresponding to the manipulation component, receives the manipulation requesting signal from the control terminal, and performs an operation corresponding to the manipulation requesting signal upon receipt of

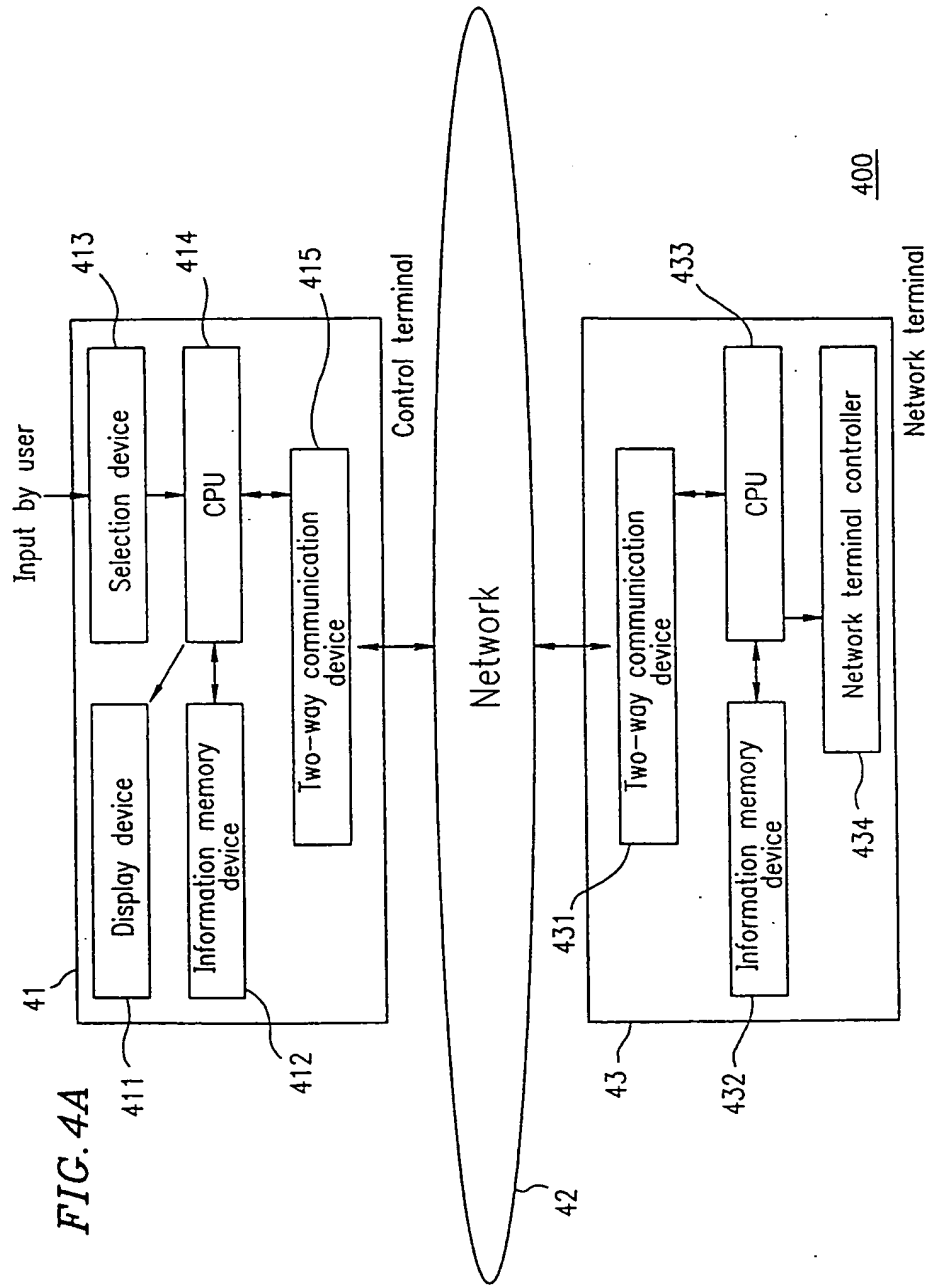
the manipulation requesting signal from the control terminal; and

a control terminal which receives and analyzes the manipulation information, establishes the manipulation environment indicated by the manipulation information, and when the manipulation environment is manipulated intended for the function, transmits the manipulation requesting signal to at least one of the network terminals.

21. A plurality of network terminals which are controlled by a control terminal including at least one manipulation component, wherein at least one of the plurality of network terminals identifies an application which can be realized by exchanging function information among the plurality of network terminals, and transmits to the control terminal manipulation information indicating a manipulation environment for controlling the function and a manipulation requesting signal, and performs an operation corresponding to the function upon receipt of the manipulation requesting signal from the control terminal.

FIG. 2





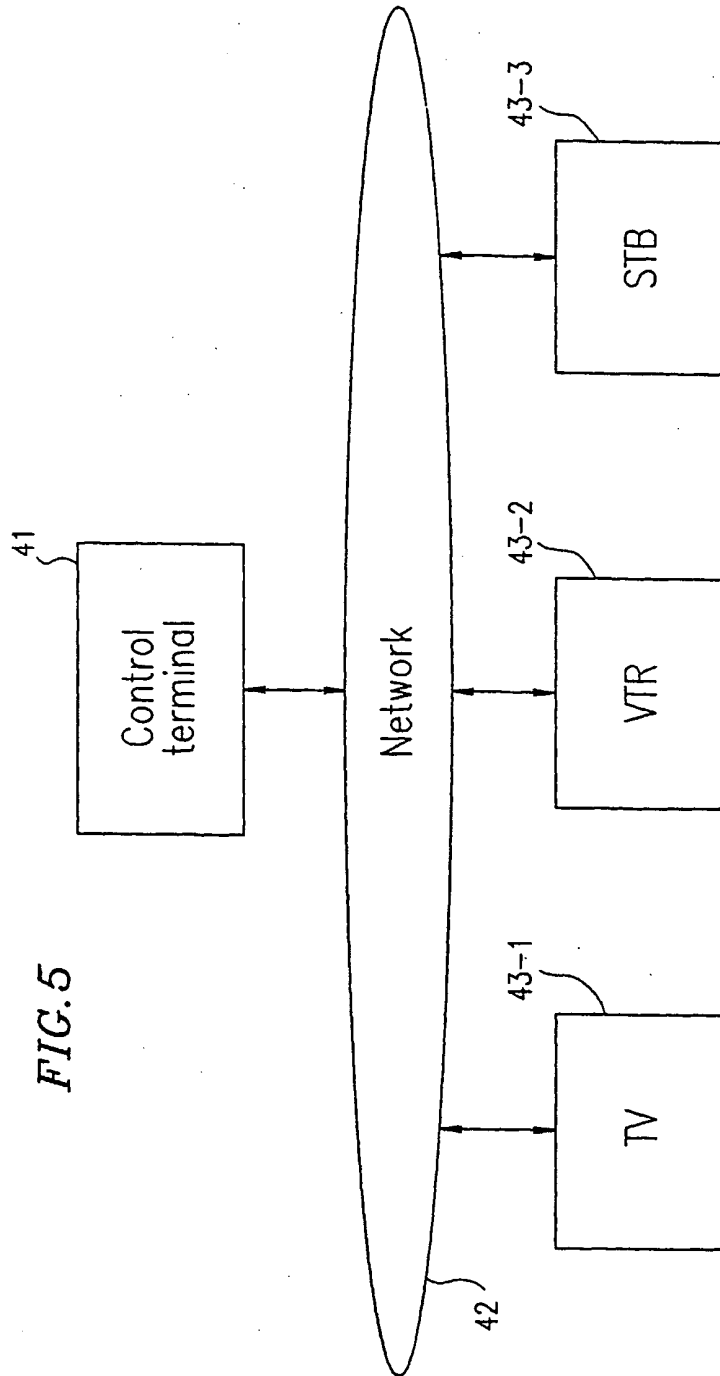


FIG. 7A

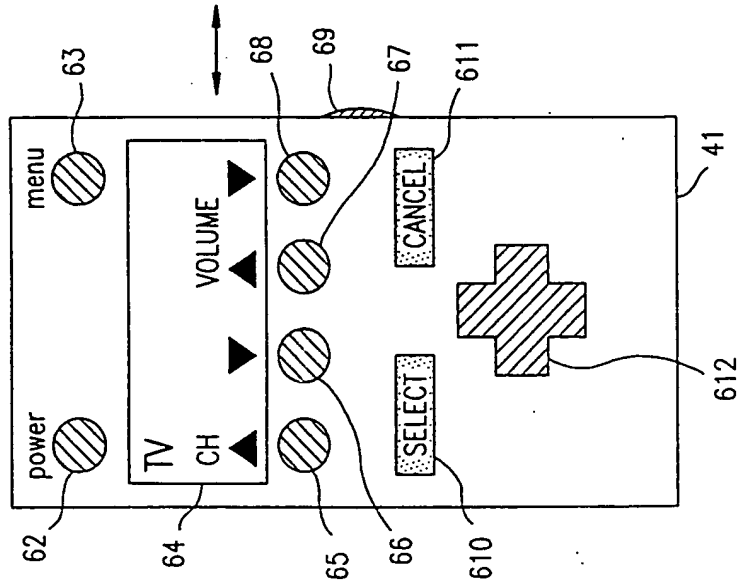


FIG. 7B

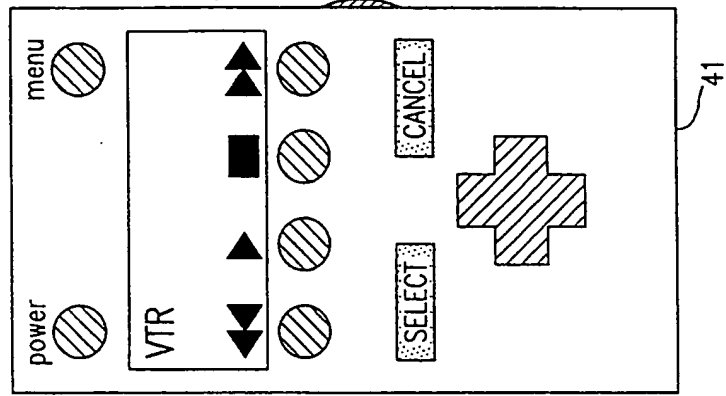


FIG. 7C

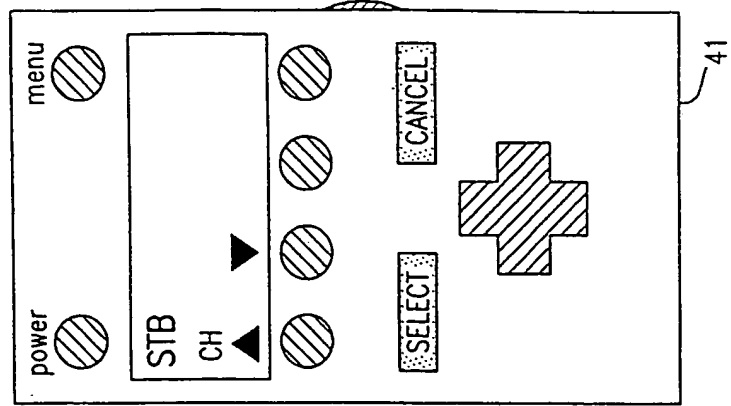
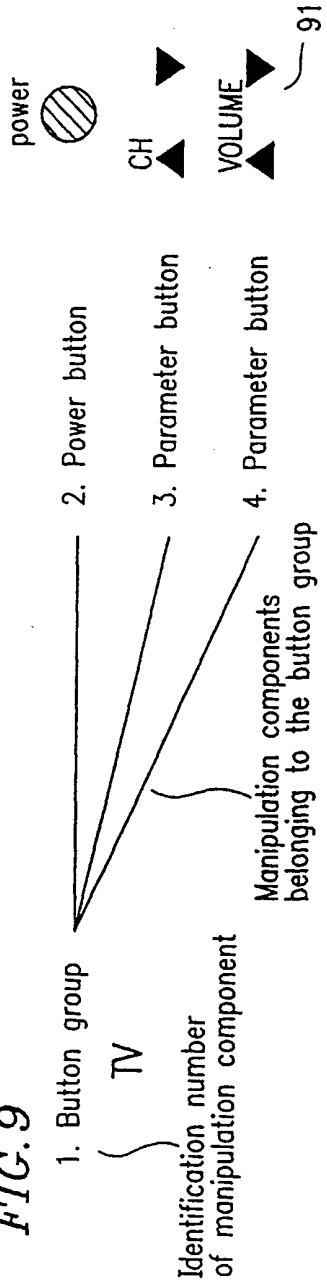
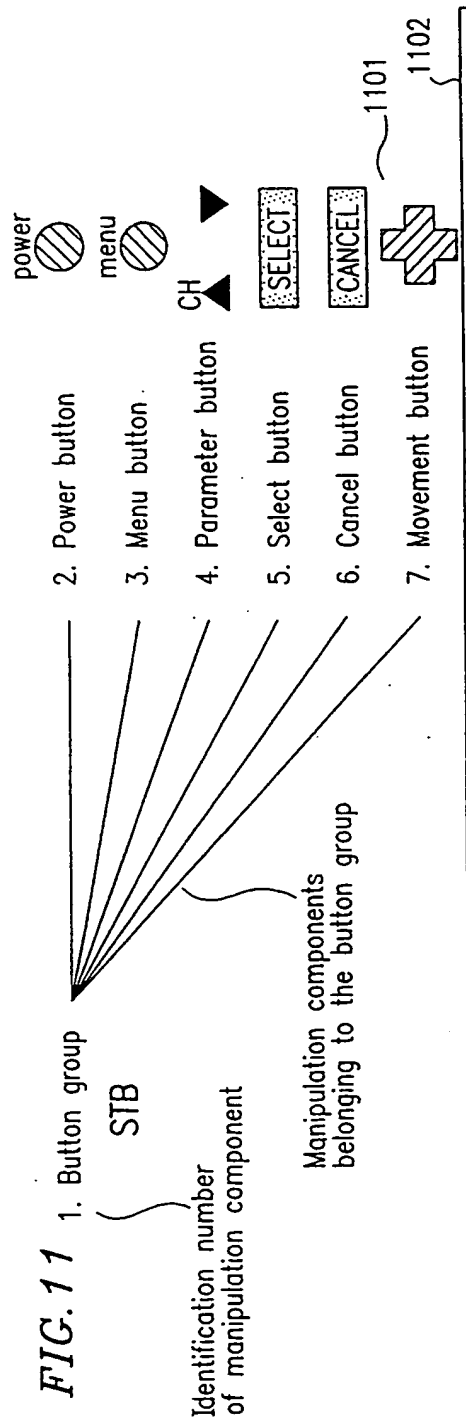


FIG. 9

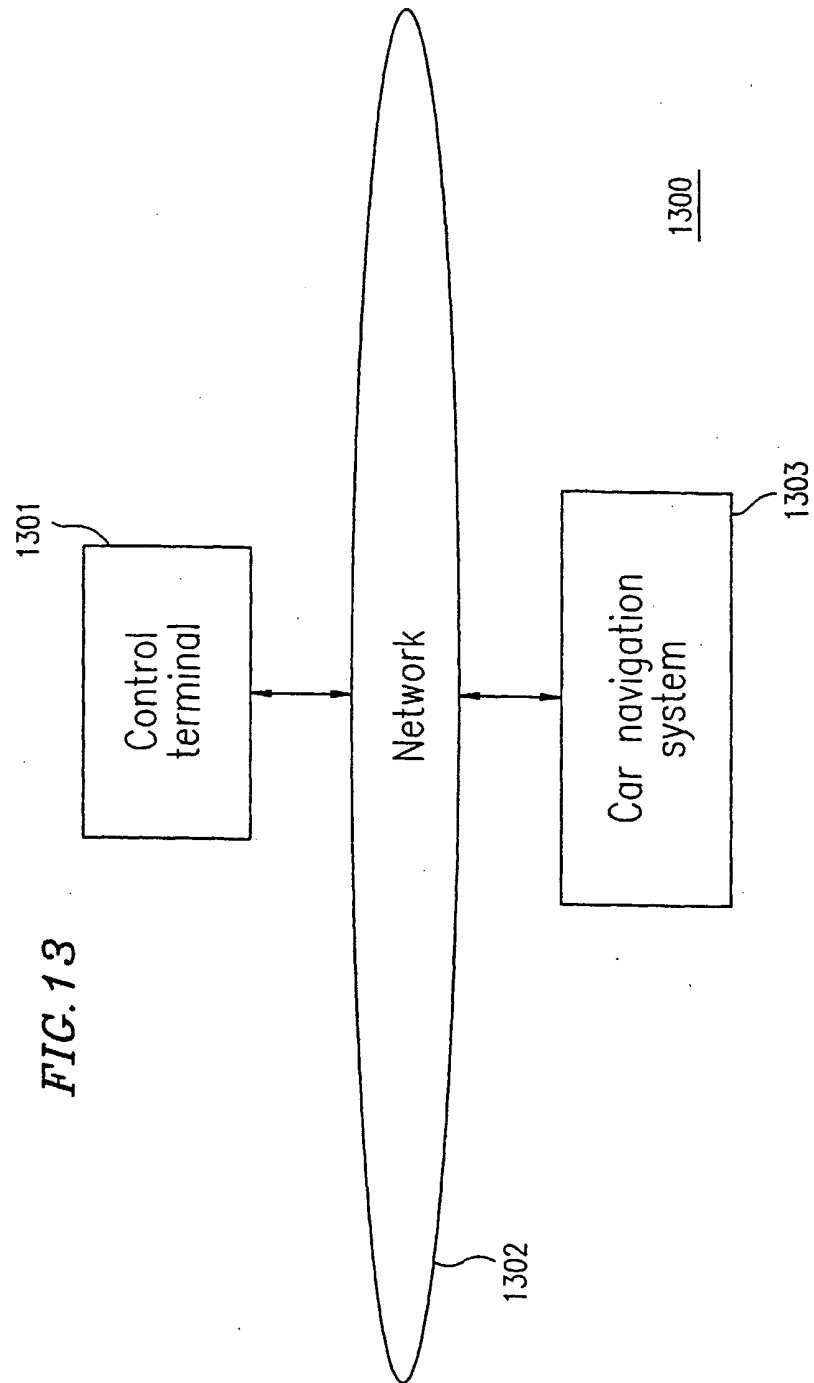


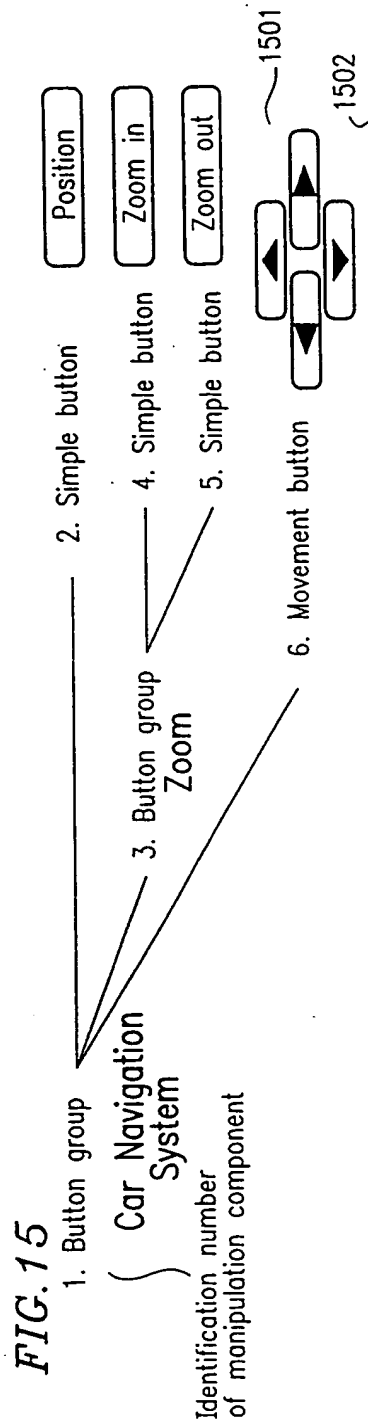
Identification number of the manipulation component	Type of manipulation component	Additional information
1	Button group	Text (TV) Identification numbers of lower order manipulation components (2,3,4) belonging to the group
2	Power button	-----
3	Parameter button	Text (CH)
4	Parameter button	Text (VOLUME)

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Identification number of the manipulation component	Type of manipulation component	Additional information
1	Button group	Text (TV) Identification numbers of lower order manipulation components (2,3,4,5,6,7) belonging to the group
2	Power button	-----
3	Menu button	-----
4	Parameter button	Text (CH)
5	Select button	-----
6	Cancel button	-----
7	Movement button	-----





Identification number of the manipulation component	Type of manipulation component	Additional information
1	Button group	Text (Car Navigation System)
2	Simple button	Identification numbers of lower order manipulation components (2,3,6) belonging to the group Text (Position)
3	Group button	Text (Zoom)
4	Simple button	Identification numbers of lower order manipulation components (4,5) belonging to the group Text (Zoom in)
5	Simple button	Text (Zoom out)
6	Movement button	-----

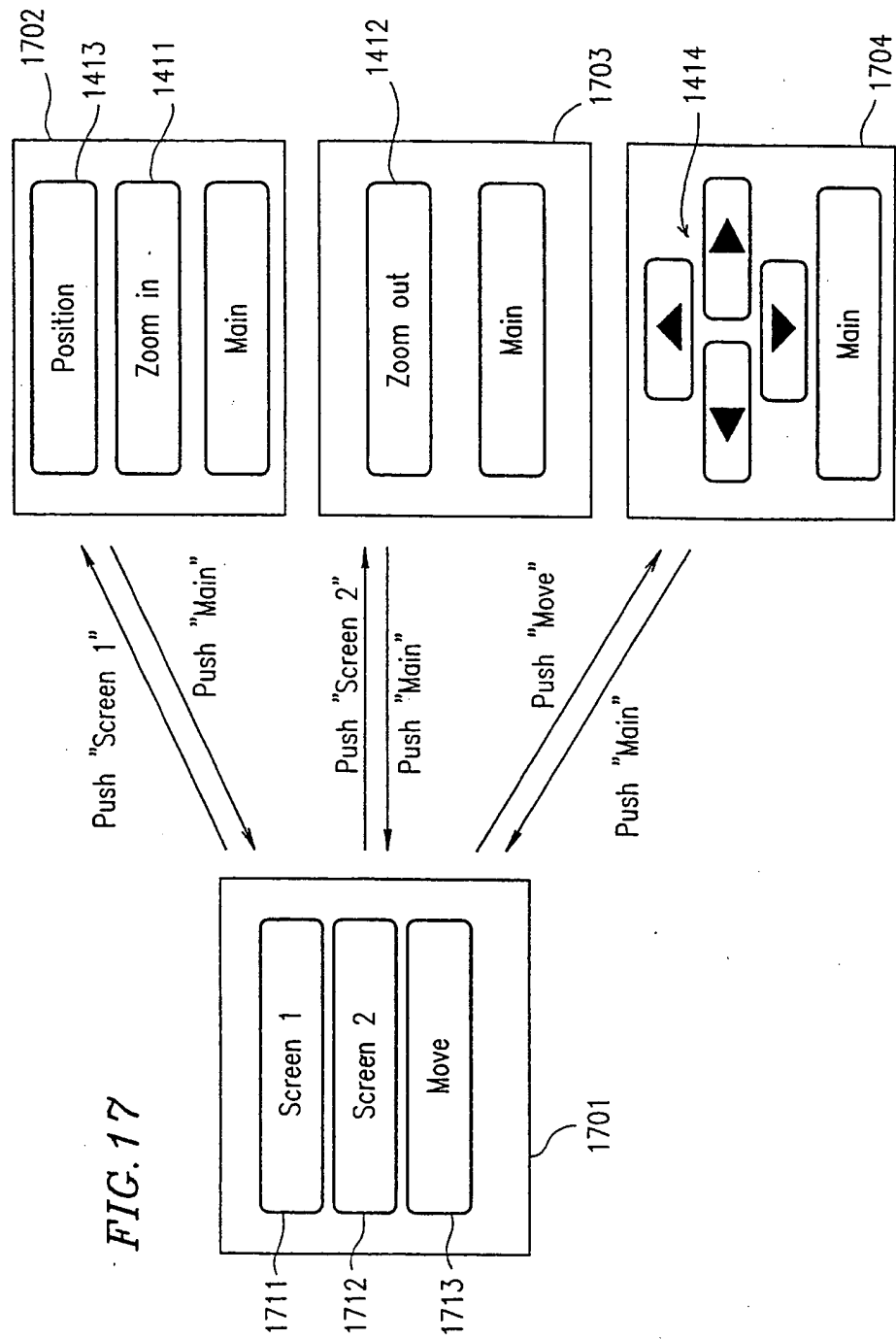


FIG. 19

Network terminal	Function information
Car navigation operator	Car navigation operation
CD-ROM driver	Car navigation data
GPS	Positioning

1901

FIG. 21A

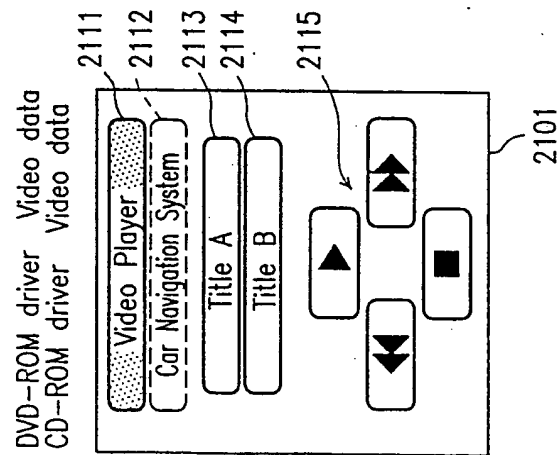


FIG. 21B

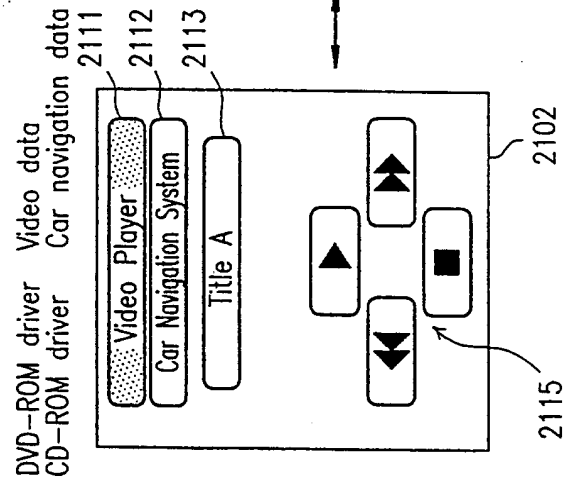


FIG. 21C

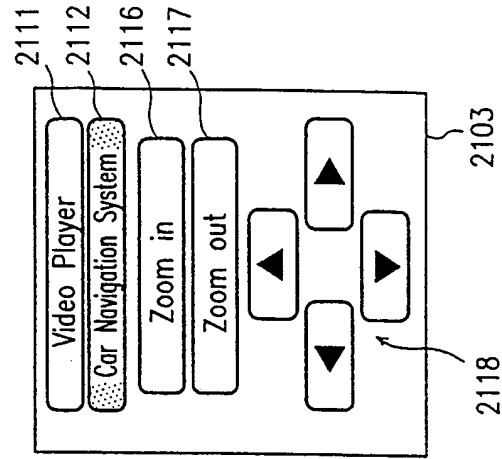
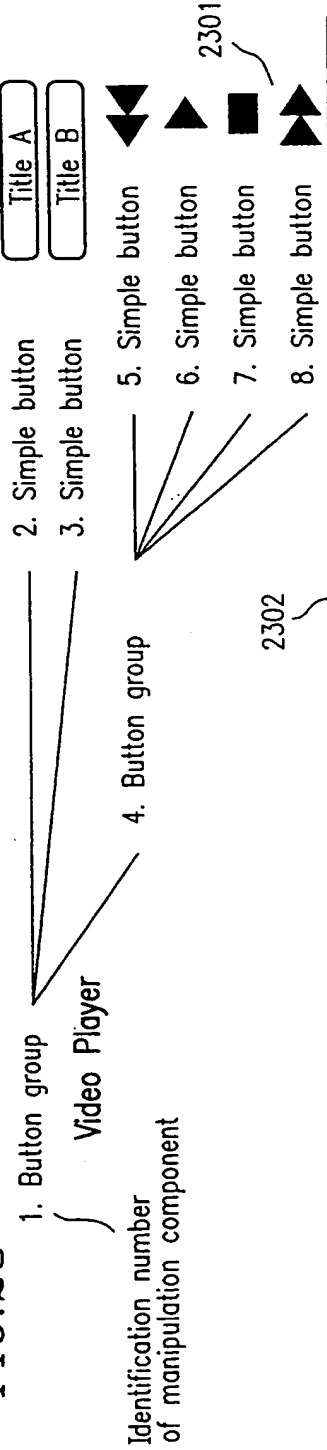


FIG. 23



Identification number of the manipulation component	Type of manipulation component	Additional information
1	Button group	Text (Video Player)
2	Simple button	Identification numbers of lower order manipulation components (2,3) belonging to the group
3	Simple button	Text (Title A)
4	Button group	Text (Title B)
5	Simple button	Identification numbers of lower order manipulation components (5,6,7,8) belonging to the group
6	Simple button	Icon
7	Simple button	Icon
8	Simple button	Icon

FIG. 25

1. Button group class

Car Navigation System

Identification number
of manipulation component

2501

Identification number of the manipulation component	Type of manipulation component	Additional information
1	Button group	Text (Car Navigation System) Identification numbers of lower order manipulation component (none) belonging to the group

2502

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